

2026 年度シラバス

科目分類/Subject Categories			
学部等/Faculty	/大学院工芸科学研究科（博士前期課程）： /Graduate School of Science and Technology (Master's Programs)	今年度開講/Availability	/有 : /Available
学域等/Field	/独立専攻 : /Fibro/BBM	年次/Year	/1 ~ 2 年次 : /1st through 2nd Year
課程等/Program	/先端ファイブ科学専攻 : /Master's Program of Advanced Fibro-Science	学期/Semester	/秋学期 : /Fall term
分類/Category	/授業科目 : /Courses	曜日時限/Day & Period	/集中 : /Intensive

科目情報/Course Information				
時間割番号 /Timetable Number	65119914			
科目番号 /Course Number	65160205			
単位数/Credits	2			
授業形態 /Course Type	講義 : Lecture			
クラス/Class				
授業科目名 /Course Title	バイオテクノロジー : Biotechnology			
担当教員名 / Instructor(s)	/WE-TEAM 関係教員 : /Related teacher of WE-TEAM			
その他/Other	インターンシップ実施 科目 /Internship	国際科学技術コース提供 科目 /IGP	PBL 実施科目 /Project Based Learning	DX 活用科目 /ICT Usage in Learning
	実務経験のある教員による 科目 /Practical Teacher			
科目ナンバリング /Numbering Code				

授業の目的・概要 /Objectives and Outline of the Course	
日	The main goal is to obtain an overview of the characteristic aspects of biotechnology and the application in textile processing. Keywords: Proteins, enzymes, properties, kinetics, micro organisms, cells, immobilisation, stoichiometry, mass transfer, mas
英	The main goal is to obtain an overview of the characteristic aspects of biotechnology and the application in textile processing. Keywords: Proteins, enzymes, properties, kinetics, micro organisms, cells, immobilisation, stoichiometry, mass transfer, mass balances, bioreactors Skills: <ul style="list-style-type: none"> • describe differences and similarities between chemical process techn. & bioprocess techn. • the students will know the general diff between bacteria, viruses, fungi, plant / animal cells • the students can describe the advantages and disadvantages of immobilisation • students are able to use models for enzyme kinetics and stoichiometry students can use models for enzyme kinetics, stoichiometry

学習の到達目標 /Learning Objectives	
日	Student can describe differences and similarities between chemical process techn. & bioprocess techn. Students will know the general diff between bacteria, viruses, fungi, plant / animal cells Students can describe the advantages and disadvantages of immobilisation Students are able to use models for enzyme kinetics and stoichiometry students can use models for enzyme kinetics
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Students will know the general diff between bacteria, viruses, fungi, plant / animal cells
Students can describe the advantages and disadvantages of immobilisation
Students are able to use models for enzyme kinetics and stoichiometry students can use models for enzyme kinetics

学習目標の達成度の評価基準 / Fulfillment of Course Goals (JABEE 関連科目のみ)	
日	
英	

授業計画項目 /Course Plan			
No.		項目 Topics	内容 Content
1	日	Introduction to Biotechnology	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
	英	Introduction to Biotechnology	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
2	日	Proteins and Enzymes	Relate biotechnological problems to other disciplines, understanding enzymes + characteristics
	英	Proteins and Enzymes	Relate biotechnological problems to other disciplines, understanding enzymes + characteristics
3	日	Enzyme Kinetics	Properties of Enzyme and Enzyme Kinetics
	英	Enzyme Kinetics	Enzyme Kinetics
4	日	Micro Organisms	Micro Organisms
	英	Micro Organisms	Micro Organisms
5	日	Cells (growth, metabolism)	Cells (growth, metabolism)
	英	Cells (growth, metabolism)	Cells (growth, metabolism)
6	日	Cells (DNA, enzymes)	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
	英	Cells (DNA, enzymes)	Understand the differences between bacteria, viruses, fungi, plant cells and animal cells
7	日	Stoichiometry of Growth and Production	Stoichiometry of Growth and Production
	英	Stoichiometry of Growth and Production	Stoichiometry of Growth and Production
8	日	Immobilisation 1	Obtain an understanding of immobilisation 1
	英	Immobilisation 1	Obtain an understanding of immobilisation 1
9	日	Immobilisation 2	Obtain an understanding of immobilisation 2
	英	Immobilisation 2	Obtain an understanding of immobilisation 2
10	日	Stoichiometry of Growth and Production 1	Stoichiometry of Growth and Production 1
	英	Stoichiometry of Growth and Production 1	Stoichiometry of Growth and Production 1
11	日	Stoichiometry of Growth and Production 2	Stoichiometry of Growth and Production 2
	英	Stoichiometry of Growth and Production 2	Stoichiometry of Growth and Production 2
12	日	Enzymes in Textile Processing 1	Present the main steps of biotechnological processes in textile processing 1
	英	Enzymes in Textile Processing 1	Present the main steps of biotechnological processes in textile processing 1
13	日	Enzymes in Textile Processing 2	Present the main steps of biotechnological processes in textile processing 2
	英	Enzymes in Textile Processing 2	Present the main steps of biotechnological processes in textile processing 2
14	日	Wetting and Wicking	Wetting and Wicking

	英	Wetting and Wicking	Wetting and Wicking
15	日	Capillarity and Porosity	Capillarity and Porosity
	英	Capillarity and Porosity	Capillarity and Porosity

履修条件 /Prerequisite(s)	
日	
英	

授業時間外学習（予習・復習等） /Required study time, Preparation and review	
日	Initial competences: <ul style="list-style-type: none"> • Bsc level in mathematics, organic chemistry, physical chemistry, general process engineering, textile technology and materials engineering
英	Initial competences: <ul style="list-style-type: none"> • Bsc level in mathematics, organic chemistry, physical chemistry, general process engineering, textile technology and materials engineering

教科書／参考書 /Textbooks/Reference Books	
日	Biotechnology in Textile Processing 1st Edition, By Ryszard Kozlowski, Georg M. Guebitz, Artur Cavaco-Paulo, ISBN 9781560221432, Published by CRC Press
英	Biotechnology in Textile Processing 1st Edition, By Ryszard Kozlowski, Georg M. Guebitz, Artur Cavaco-Paulo, ISBN 9781560221432, Published by CRC Press

成績評価の方法及び基準 /Grading Policy	
日	End-of-term evaluation Examination methods in case of periodic evaluation during the first examination period: Written Examination Examination methods in case of periodic evaluation during the second examination period: Written Examination During exami
英	End-of-term evaluation Examination methods in case of periodic evaluation during the first examination period: Written Examination Examination methods in case of periodic evaluation during the second examination period: Written Examination During examination period: written closed-book exam

留意事項等 /Point to consider	
日	Teaching language is English. Intensive course
英	Teaching language is English. Intensive course